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厦门大学

博 士 学 位 论 文

产险公司运行机制稳定性研究

Research on Stability of Operating Mechanism of Property-Casualty Insurance Companies

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摘 要

21 世纪金融海啸又一次暴露了金融市场的稳定性问题，金融海啸后的痛定思痛，金融稳定性问题又一次成为了理论和实践探索的热点。我国产险市场是一个尚未成熟，可以说还是相对比较脆弱的市场，有如下显著的表现：(1)产险公司时有面临偿付能力不足的压力；(2)产险产品价格竞争剧烈致承保亏损严重；(3)巨灾风险频乃影响产险公司财务稳定性；(4)保险基金投资风险加大且收益率下降。

可见进入 21 世纪尤其国际金融海啸以来，国际和我国产险公司都存在着前所未有的不稳定性现象，尽管各国保险监管的制度设计都发挥了相对的风险管控功能与作用，但是产险公司风险的内在不确定性和随机的不可预测性，决定了保险监管制度静态的局限性，本文以保险与金融相互渗透、互动发展为脉络，探求保险市场风险与金融市场风险相互渗透、互动发展的内在稳定性机制及其风险管控系统量化设计的可能性与可行性，为产险公司稳定、可持续运行提供理论支持和实践参考。

本文目的在于探寻产险公司运行稳定性的内在数量均衡，由此本文的研究目标亦为回答如下四个问题：(1)产险公司运行稳定性之质的规定性是什么？(2)产险公司运行稳定性的影响要素是什么？(3)这些要素如何进行数量界定？(4)这些要素内在数量均衡关系如何？

本文共有 6 章，具体章节安排如下：

绪论。本章阐述了本文的研究背景与意义，整合国内外相关文献，简要介绍文章的研究内容与逻辑架构、采用的研究方法、本文创新点以及待进一步研究的问题。

第一章，运行机制稳定性与脆弱性的的哲学观。既有文献在阐述运行机制稳定性与稳定、运行机制脆弱性与脆弱这两对概念时，往往含混不清，多有将本质与现象混淆之嫌。本章以唯物辩证哲学观，首先分别界定了事物运行机制稳定性和脆弱性的内涵，认为该两者是事物的内在属性，而稳定和脆弱则是事物分别表现出来的一种状态；其次以质量互变关系，阐明稳定性表现为该事物内在诸要素变量的结构均衡，而量的失衡到了一定程度该事物的内在稳定属性也就转化为

内在脆弱性(质变)。本章是后续各章的奠基性研究，尤其是，本文对运行机制稳定性内涵之揭示，为本文第二章的定性分析，第三至五章的定量分析和第六章的实证分析提供了原理性根据。

第二章，产险公司运行机制稳定性与脆弱性。根据本文第一章运行机制稳定性之内涵，本章从产险公司运行机制稳定性的质和量两个视角来梳理与分析产险公司运行机制内在稳定性原理。首先分析产险公司运行稳定性之质的规定性——偿付能力；其次分析产险公司运行稳定性的影响要素——产险产品价格、承保能力和保险基金投资收益；最后提出为保证产险公司偿付能力的产险产品定价模型、承保能力边界模型和保险基金投资结构模型，为产险公司运行稳定性内在数量关系研究作理论准备。

第三章，基于不完善金融市场产险产品市场定价模型与运行机制稳定性。本章根据第一章的理论分析和第二章的定性分析可知，产险产品价格是产险公司运行稳定性的影响要素之一。本章首先分析产险产品定价风险与偿付能力的相关性和产险产品定价风险的构成要素；其次对现有产险产品定价模型进行比较与评介；最后针对现有产险产品定价模型的不足，本文给出基于不完善金融市场产险产品市场定价模型，采用给出的模拟数据，运用该模型算得产险产品价格为0.0045，而运用产险传统定价模型算得产险产品价格为0.004953。

第四章，基于“自助法”产险公司承保能力边界模型与运行机制稳定性。本章根据第一章的理论分析和第二章的定性分析可知，承保能力是产险公司运行稳定性的影响要素之一。本章首先分析承保能力风险与偿付能力的相关性和承保能力风险的构成要素；其次对现有承保能力边界说进行比较与评介；针对现有承保能力边界说的不足，本章提出基于“自助法”产险公司承保能力边界模型，运用该模型算得我国产险公司承保能力边界为 3.12；最后基于“自助法”对我国承保能力经验边界规定进行分析。

第五章，基于均值—方差产险公司投资结构模型与运行机制稳定性。本章根据第一章的理论分析和第二章的定性分析可知，保险基金投资收益是产险公司运行稳定性的影响要素之一。本章首先分析产险公司投资风险与偿付能力的相关性和产险公司投资风险要素；其次通过比较美国、日本、台湾地区和我国保险基金投资结构的差异，找出我国保险基金投资结构的不足；最后针对这些不足，提出

基于均值—方差产险公司投资结构模型，采用给出的模拟数据，运用该模型算得保险基金投资结构：无风险资产投资比例为 0.4922，风险资产投资比例为 0.5078。

第六章，产险公司稳定性内在要素变量均衡计量模型及其运用模拟。本章根据第一章的理论分析，第二章的定性分析和第三至五章的定量分析，首先以产险公司偿付能力为被解释变量，以产险产品市场价格、承保能力边界和保险基金投资收益率为解释变量，建立线性回归计量模型，根据该计量模型，假定产险产品市场价格和承保能力边界分别为 0.003 和 3.12，为保证产险公司的偿付能力，只需要保险基金投资收益率大于-0.2881 即可，在此产险产品市场价格和承保能力边界条件下，此为资产收益率不伤及偿付能力的极限边界；其次根据灰色关联度分析法对产险公司偿付能力的影响因素进行分析；最后提出相应的对策建议。

关键词：运行机制稳定性；偿付能力；产险产品价格；承保能力；保险基金投资收益

Abstract

The financial tsunami in 21st century again exposed the stability problem of financial markets. Recalling the bitter experience, financial stability has once again become a hot spot of theory and practice. Chinese property-casualty insurance market is not mature yet, which we can say is still relatively weak. Significant manifestations are as follows: (1) Property-casualty insurance companies faces the pressure of inadequate solvency capacity; (2) Fierce price competition of property-casualty insurance products cause severe underwriting losses; (3) Frequency of catastrophe risk is affecting the financial stability of property-casualty insurance companies; (4) Investment risk of insurance fund increases while profits decrease.

We can see that after stepping into the 21st century, especially since the international financial crisis, international and Chinese property-casualty insurance companies are showing the phenomena of unprecedented instability. Even though the system design of each country's property-casualty insurance supervision have played a relatively risk control function and role, inherent uncertainty and unpredictability of random of property-casualty insurance companies risk determines the limitations of static property-casualty insurance regulatory system. In this paper, along with mutual penetration and interactive development property-casualty between insurance and finance, we explore interwoven and mutual internal stabilization mechanism of the interwoven property-casualty insurance market risk and financial market risk and possibility and feasibility of quantification design of risk supervision system, provide theoretical support and practical reference for stable and sustainable operation of property-casualty insurance companies.

This paper aims to explore the inherent numeral relations of operating stability of property-casualty insurance companies, thus research goal of this paper is also to answer the following four questions: (1) What are provisions of the nature of property-casualty insurance companies operating stability mechanism? (2) What are factors affecting of the stability of property-casualty insurance companies' operation? (3) How to define these elements in number? (4) How these elements exist inner equilibrium relationship?

There are six chapters in this paper and specific sections are as follows:

Introduction. This chapter describes the background and significance of this paper, integrates relevant literature at home and abroad, briefly introduces the

research content and logical architecture, research methods, innovations and issues to be further studied.

Chapter 1, Philosophy of Stability and Vulnerability of Operating Mechanism. In existing literature, two pairs of concepts, operating mechanism stability and stable operation & operating mechanism vulnerability and vulnerable operation are often confused that fail to account for the difference and connection between them, which raised doubts of confounding essence with phenomenon. Based on philosophy of dialectical materialism, this chapter firstly defines the connotation of operating mechanism stability and operating mechanism vulnerability respectively, which reveals inherent properties of things while stable operation and vulnerable operation are states of things. Secondly, according to the relationship of quality and quantity, this paper clarifies that stability shows the structural balance of various inherent elements of things, while inherent stability of things would convert to inherent vulnerability (qualitative change) when imbalance of quantity reached a certain extent. This chapter is groundbreaking research for the following chapters, especially revealing the connotation of operating mechanism stability provides theoretical basis for the qualitative analysis of Chapter 2 , the quantitative analysis of Chapter 3-5 and the empirical analysis of Chapter 6.

Chapter 2, Stability and Vulnerability of Operating Mechanism of Property-Casualty Insurance Companies. First, this chapter analyzes the provisions of stability of operating mechanism of property-casualty insurance companies –solvency. Secondly, analyzes the elements that affect the operation of property-casualty insurance companies–the price of property-casualty insurance products, property-casualty insurance companies' underwriting capacity and insurance funds investment profits, making a theoretical preparation for the research on inherent numeral relations of stability of operating mechanism of property-casualty insurance companies.

Chapter 3, Market Pricing Model of Insurance Product based on Incomplete Financial Market and Stability of Operating Mechanism. According to the theoretical analysis of Chapter 1 and the qualitative analysis of Chapter 2, property-casualty insurance product prices is one of the factors affecting the stability of property-casualty insurance companies to run. This chapter first analyzes correlation between property-casualty insurance product pricing risk and solvency capacity, property-casualty insurance product pricing risk；then analyzes constituent elements of property-casualty insurance product pricing risk; introduce

property-casualty insurance products market pricing model based on complete financial market; Finally, property-casualty insurance product market pricing model was offered based on incomplete financial market. Using given simulated data, property-casualty insurance products price is 0.0045, while property-casualty insurance products traditional price is 0.004953.

Chapter 4, Property-Casualty Insurance Companies Underwriting Capacity Boundary Model based on "Bootstrpping" and Stability of Operating Mechanism. According to the theoretical analysis of Chapter 1 and the qualitative analysis of Chapter 2, underwriting capacity is one of the factors affecting operating stability. This chapter first analyzes the correlation between underwriting capacity risk and solvency capacity, constituent elements of underwriting capacity risk; then compared and criticized the existing boundary theories of insurance capacity. Directing at inadequate boundary theories of insurance capacity, "bootstrpping" underwriting capacity boundary model is offered, by which we get insurance companies underwriting capacity boundary is 3.12 in China. Finally, based on "bootstrpping", we analyzed provisions of underwriting capacity of the border experience in China.

Chapter 5, Property-Casualty Investment Structure Model based on Mean-Variance and Stability of Operating Mechanism. According to the analysis theoretical analysis of Chapter 1 and the qualitative analysis of Chapter 2, the insurance fund investment income is one of the factors affecting the operating stability of property-casualty insurance companies. This chapter first analyzes correlation between investment risk and solvency capacity of property-casualty insurance companies; analyzes property-casualty insurance companies investment risk factors; By comparing insurance fund investment structure in the USA, Japan, Taiwan and the Chinese mainland, identify gaps in Chinese insurance fund investment structure; Finally, directing at the gaps, we put forward property-casualty insurance companies investment structure model based on the mean-variance. Using given simulated data, we calculate insurance fund investment structure: risk-free asset investment proportion is 0.4922, risk asset investment proportion is 0.5078.

Chapter 6, Property-Casualty Insurance Companies' Intrinsic Element of Stability Variable Equilibrium Econometric Model and its Application of Simulation. According to the theoretical analysis of Chapter 1, the qualitative analysis of Chapter 2 and the quantitative analysis of Chapter 3-5, solvency capacity of property-casualty insurance companies is interpreted variable, property-casualty

insurance prices, property-casualty insurance companies underwriting capacity boundaries and insurance funds investment yield are explanatory variables, linear regression measurement model is established. Based on the econometric model, when the price of property-casualty insurance products is 0.003, underwriting capacity is 3.12. In order to ensure the solvency capacity of property-casualty insurance companies, return rate of insurance fund investment has only to be greater than -0.2881. At this price and under property-casualty insurance underwriting capacity conditions, we get the return rates of assets which does not hurt limited boundary of solvency capacity. Secondly, according to gray relational degree analysis method, factors that affecting solvency of property insurance company are analyzed. Finally, we put forward the corresponding suggestions.

Key Words: Stability of Operating Mechanism; Solvency; Property-Casualty Insurance Prices; Underwriting Capacity; Insurance Fund Investment Income

目 录